# EPA's Management Measures Guidance to Control Nonpoint Source Pollution from Urban Areas

***It's Time to Develop and Implement Your Storm Water Management Program…Are You Ready?***

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## *It's Time to Develop and Implement Your Storm Water Management Program…Are You Ready?*

## Introduction

Urban runoff/storm sewers were listed among the top three sources of water quality impairment in rivers, lakes, and estuaries, according to the *National Water Quality Inventory: 1998 Report to Congress* (USEPA, 2000). This indicates that urban areas have been a substantial contributor to the decline of water resources in the U.S. As population continues to grow and urban areas expand (see Figure 1), the quality of water bodies near urban centers will continue to be threatened unless actions are taken to reduce the impact of everyday human activities on water resources.

This is not just an issue of pollutant loading, although urban areas can be a significant source of several pollutants, especially nutrients, sediments, heavy metals, and toxic chemicals. Also of concern are the increase in the volume of runoff and the change in runoff timing that results when land in a predominantly pervious condition (i.e., forested or meadow) is converted to impervious surfaces—buildings, streets, sidewalks, parking lots, or other infrastructure.

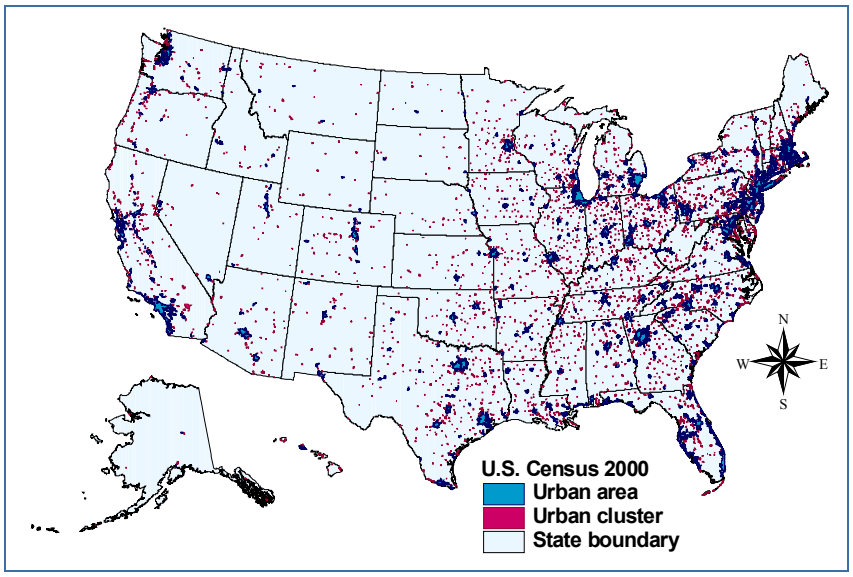


Figure 1. Urban areas and urban clusters according to the 2000 U.S. Census (USCB, 2002)

The complicating factor in mitigating urban storm water is that the sources of pollution are diffuse and are therefore difficult to locate and manage. For example, nutrient pollution in urban areas can come from a variety of sources that include failing septic systems, improper connections to the storm drain system, overfertilization of lawns, and poorly managed pet waste. Each source can require a different strategy for elimination, which can seem overwhelming to small programs faced with pollution problems.

Because managing urban storm water is not a simple task, EPA has developed guidance to help watershed managers put together a comprehensive and effective program to address a myriad of urban sources. The most recent guidance, called *National Management Measures to Control Nonpoint Source Pollution from Urban Areas—Draft*, is an update of Chapter 4 of the 1993 *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*.

The 1993 document was designed to aid coastal states in developing nonpoint source control programs to meet the requirements of the Coastal Zone Act Reauthorization Amendments of 1990. The 2002 guidance document is intended to provide technical assistance to state and local program managers and other practitioners on the best available, most economically achievable means of managing urban storm water. It describes how to develop a "comprehensive runoff management program" that deals with all phases of development—from predevelopment watershed planning and site design, through the construction phase of development, to the operation and maintenance of structural controls. It also provides information for other situations such as retrofitting existing development, implementing nonstructural controls,

and reevaluating the storm water management program (see Figure 2).

## How Does This Relate to NPDES Phase II Storm Water?

The publication of the guidance is timely because thousands of small municipalities (with a population between 1,000 and 10,000 with a population density of at least 1,000 people per square mile) and other entities (e.g., private institutions, Department of Defense facilities) that own and operate separate storm sewer systems will need to apply for a permit to discharge municipal storm water under Phase II of the National Pollutant Discharge Elimination System (NPDES) Storm Water Program. NPDES permit coverage must be obtained by March 10, 2003. To meet the requirements outlined in the Phase II Storm Water Rule (Box 1), regulated municipalities must implement a storm water management program that includes best management practices (BMPs) and measurable goals for six minimum control measures.

Figure 2. Comprehensive Runoff Management Program

### Box 1. NPDES Storm Water Phase II Program Requirements

Regulated municipalities must develop and implement a Storm Water Management Program (SWMP) that will reduce pollutants in storm water to the Maximum Extent Practicable (MEP). The SWMP must include BMPs for each of the 6 Minimum Control Measures, which are:

1. Public Education and Outreach on Storm Water Impacts
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Control
5. Post-Construction Storm Water Management in New Development and Redevelopment
6. Pollution Prevention/Good Housekeeping for Municipal Operations

In addition to BMPs, regulated municipalities will also have to develop Measurable Goals that will allow both the municipality and the permitting authority to gauge whether each BMP was successful. Municipalities also need to develop a timeline for implementation of each element of the program and identify the party or parties responsible.

## How Can Your Storm Water Management Program Be Both Comprehensive and Cost-Effective?

The *National Management Measures to Control Nonpoint Source Pollution from Urban Areas—Draft* presents a comprehensive process for developing a program from scratch or from existing programs. The guidance includes information about establishing institutional frameworks, securing funding sources, conducting assessments, working with stakeholders, and implementing structural and non-structural BMPs.

The process is presented in a stepwise fashion that is organized by management measures, which each cover a distinct topic area such as roads and highways, construction sites, pollution prevention, etc. The management measures provide a framework for grouping BMPs based on their role in mitigating the effects of urban runoff. Storm water managers can use this organizing framework to ensure that their program addresses the entire range of pollutants and sources with a set of BMPs that work together in a streamlined, cost-effective way.

Each management measure also describes a set of performance objectives or goals for a specific area of storm water management. These goals are somewhat

broader in scope than what EPA intends for measurable goals under the NPDES Phase II Storm Water Program, but they can be adapted for use in the storm water management program. For example, the Site Development Management Measure states the following:

Plan, design, and develop sites to

- Maintain predevelopment site hydrology by using site design techniques that store, infiltrate, evaporate, or detain runoff.
- Protect areas that provide important water quality benefits or are particularly susceptible to erosion and sediment loss.
- Limit increases of impervious areas unless predevelopment site hydrology is maintained (Figure 3). Limit land disturbance activities, such as clearing and grading and cut-and-fill, to reduce erosion and sediment loss.
- Limit disturbance of natural drainage features and vegetation.

Figure 3. Urban areas contain a great deal of impervious surface that accumulates pollutants and transports runoff rapidly to receiving waters

Some BMPs that were considered appropriate for meeting this management measure are:

- Promoting the use of cluster and open space development
- Providing incentives to developers to reduce impervious areas
- Conducting site assessments to identify ecologically or historically significant areas for preservation and locate key opportunities for storm water management and ground water recharge.
- Reducing the size of impervious surfaces by using green roofs or modifying sidewalk, driveway, or road standards

Some measurable goals that can be derived from this management measure are as follows:

- Conduct a study, to be completed by the 3rd year of the 5-year permit, to determine an appropriate minimum storm water infiltration rate for practices installed in new development. Also examine ways that impervious area or density credits can be offered for innovative and highly effective storm water management practices.
- Describe a protocol for developers to use to determine the amount of infiltration and detention practices needed to maintain predevelopment hydrology and publish this protocol in a report to be distributed to all developers working within the NPDES-permitted area or to be included in a local ordinance.
- Conduct a survey to identify areas that provide water quality benefits (e.g., ground water recharge areas, areas with steep slopes or highly erodible soils, ecologically significant areas) in the 1st year of the permit. Conduct a study that examines alternatives for protecting the priority lands identified above by the 3rd permit year. Incorporate this into guidance provided to the development community.

## How Can the Manual Help You Meet the 6 Minimum Control Measures?

Below is a matrix showing how each section of *National Management Measures to Control Nonpoint Source Pollution from Urban Areas—Draft* relates to the 6 minimum control measures of NPDES Phase II Storm Water.

## How Do the Management Measures Compare to the 6 Minimum Control Measures of NPDES Phase II?

| | Public Education | Public Involvement | Illicit Discharge | Construction Site ESC | Post-construction | Pollution Prevention |
|---|---|---|---|---|---|---|
| **Program Framework and Objectives** | | | | | | |
| Establish Legal Authority | | | ✓ | ✓ | ✓ | ✓ |
| Develop an Institutional Structure | | | | | | |
| Provide Adequate Funding and Staffing | | | | | | |
| Foster Input From Technical Experts, Citizens, and Stakeholders | | ✓ | | | | |
| Establish Intergovernmental Coordination | | ✓ | | | | |
| Develop Training and Education Programs and Materials | ✓ | ✓ | | | | |
| **Watershed Assessment** | | | | | | |
| Characterize Watershed Conditions | | | | | | |
| Establish a Set of Watershed Indicators | | | | | | |
| **Watershed Protection** | | | | | | |
| Identify Critical Conservation Areas | | | | | ✓ | |
| Preserve Environmentally Significant Areas | | | | | ✓ | |
| Establish and Protect Stream Buffers | | | | | ✓ | |
| Promote Urban Forestry | | | | | ✓ | |
| Encourage Waterbody & Natural Drainage Protection When Siting Developments | | | | | ✓ | |
| **Site Development** | | | | | | |
| Site Planning Practices | | | | | ✓ | |
| On-Lot Impervious Surfaces | | | | | ✓ | |
| Residential Street and Right-of-Way Impervious Surfaces | | | | | ✓ | |
| Parking Lot Impervious Surfaces | | | | | ✓ | |
| Xeriscaping Techniques | | | | | ✓ | |
| **New Development Runoff Treatment** | | | | | | |
| Detention Ponds or Vaults | | | | | ✓ | |
| Ponds | | | | | ✓ | |
| Wetlands | | | | | ✓ | |
| Infiltration Practices | | | | | ✓ | |
| Filtering Practices | | | | | ✓ | |
| Open Channel Practices | | | | | ✓ | |
| Miscellaneous Practices | | | | | ✓ | |
| **New and Existing On-Site Wastewater Treatment Systems** | | | | | | |
| Permitting and Installation Programs | | | ✓ | | | ✓ |
| Operation and Maintenance Programs | | | ✓ | | | ✓ |
| **Bridges and Highways** | | | | | | |
| Site Planning and Design Practices | | | | | ✓ | |
| Structural Runoff Controls for Highways | | | | | ✓ | |
| Structural Runoff Controls for Bridges | | | | | ✓ | |
| Bridge Operation and Maintenance Controls | | | | | | ✓ |
| Nonstructural Runoff Control Practices | | | | | | ✓ |
| **Construction Site Erosion, Sediment, and Chemical Control** | | | | | | |
| Erosion and Sediment Control Programs | | | | ✓ | | |
| Erosion Control Practices | | | | ✓ | | |
| Sediment Control Practices | | | | ✓ | | |
| Develop/Implement Programs to Control Chemicals/Construction Materials | | | | ✓ | | ✓ |

| | Public Education | Public Involvement | Illicit Discharge | Construction Site ESC | Post-construction | Pollution Prevention |
|---|---|---|---|---|---|---|
| **Pollution Prevention** | | | | | | |
| Household Hazardous Wastes | ✓ | ✓ | | | | ✓ |
| Lawn, Garden, and Landscape Activities | ✓ | ✓ | | | | ✓ |
| Commercial Activities | ✓ | ✓ | ✓ | | | ✓ |
| Proper Disposal of Pet Waste | ✓ | ✓ | | | | |
| Trash | ✓ | ✓ | | | | ✓ |
| Nonpoint Source Pollution Education for Citizens | ✓ | ✓ | | | | |
| **Existing Development** | | | | | | |
| Identify, Prioritize, and Schedule Retrofit Opportunities | | | | | ✓ | |
| Implement Retrofit Projects as Scheduled | | | | | ✓ | |
| Restore and Limit the Destruction of Natural Runoff Conveyance Systems | | | | | ✓ | |
| Restore Natural Streams | | | | | ✓ | |
| Preserve, Enhance, or Establish Buffers | | | | | ✓ | |
| Revitalize Urban Areas | | | | | ✓ | |
| **Operation and Maintenance** | | | | | | |
| Establishing an Operation and Maintenance Program | | | | | ✓ | ✓ |
| Source Control Operation and Maintenance | | | | | ✓ | ✓ |
| Treatment Control Operation and Maintenance | | | | | ✓ | ✓ |
| **Evaluate Program Effectiveness** | | | | | | |
| Assess the Runoff Management Program Framework | | | | | | |
| Track Management Practice Implementation | | | | | | |
| Gauge Improvements in Water Quality | | | | | | |

## References


U.S. Environmental Protection Agency (USEPA). 2000. *National Water Quality Inventory: 1998 Report to Congress*. http://www.epa.gov/305b/98report. Last updated and accessed September 26, 2002.

U.S. Census Bureau (USCB). 2002. *Urbanized Areas: Cartographic Boundary Files*. http://www.census.gov/geo/www/cob/ua2000.html. Last updated May 23, 2002. Accessed September 26, 2002.


## For More Information

NPDES Phase II Storm Water Program
http://cfpub.epa.gov/npdes/stormwater/swphase2.cfm

EPA Office of Wetlands, Oceans, and Watersheds
Nonpoint Source Branch
http://www.epa.gov/owow/nps/

## How To Obtain A Copy

To obtain a copy of the *National Management Measures to Control Nonpoint Source Pollution From Urban Areas—Draft*, visit www.epa.gov/owow/nps/urbanmm/index.html to download it in PDF format or contact Rod Frederick at

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